

**CLAIMS**

1. A multi-functional microarray comprising the following elements:
  - a) a solid support;
  - 5 b) a series of wells contained on the solid support;
  - c) a plurality of linkers attached to each well;
  - d) a first functionality bound to a portion of the linkers within the plurality of linkers; and
  - 10 e) a second different functionality bound to a different portion of the linkers within the plurality of linkers.
2. The microarray of claim 1 wherein the functionalities are spatially separated.
3. The microarray of claim 2 wherein a portion of the plurality of linkers have no  
15 bound functionality, thereby achieving spatial separation between the functionalities.
4. A microarray presenting chemical molecules comprising the following elements:
  - a) a solid support;
  - 20 b) a series of wells contained on the solid support;
  - c) a plurality of linkers attached to each well;
  - d) a first functionality bound to a portion of the linkers within the plurality of linkers;
  - e) a second different functionality bound to a different portion of the  
25 linkers within the plurality of linkers; and
  - f) a chemical entity bound to at least the first or the second functionality in each well, wherein the majority of wells contain different chemical entities.
- 30 5. The microarray of claim 4 wherein the functionalities are spatially separated.



6. The microarray of claim 5 wherein a portion of the plurality of linkers have no bound functionality, thereby achieving spatial separation between the functionalities.

5 7. The microarray of claim 4 wherein the chemical entities bound to the wells correspond to chemicals present in a chemical library.

8. The microarray of claim 7 wherein the chemical library is a random chemical library.

10 9. A microarray comprising a plurality of functionalities attached to a solid support, wherein the plurality of functionalities is attached to the solid support by a plurality of linkers and further wherein each different functionality is bound to a different portion of the plurality of linkers.

15 10. The microarray of claim 9 wherein the functionalities are spatially separated.

11. The microarray of claim 10 wherein a portion of the plurality of linkers have no bound functionality, thereby achieving spatial separation between the functionalities:

20 12. The microarray of claim 9 further comprising chemical entities bound to the plurality of functionalities, wherein the majority of wells contain different chemical entities.

25 13. The microarray of claim 12 wherein the chemical entities correspond to chemicals present in a chemical library.

30 14. The microarray of claim 13 wherein the chemical library is a random chemical library.



15. A microarray according to any one of claims 1, 4, 9 or 12 wherein the solid support comprises glass and the linkers comprise silane compounds.

5 16. A microarray according to any one of claims 1, 4, 9 or 12 wherein the functionalities are any combination of alcohol, phenol, aldehyde, ketone, carboxylate, amino group, aryl halide, alkyl halide or sulfhydryl.

10 17. A process of preparing a multi-functional microarray comprising attaching a plurality of functionalities to a solid support through a plurality of linkers, wherein the solid support is divided into wells and further wherein at least one functionality of the plurality of functionalities is represented in each well.

18. A microarray prepared by the process of claim 17.

15 19. The process of claim 17 further comprising spatially separating the functionalities.

20 20. The process of claim 19 wherein a portion of the plurality of linkers have no bound functionality, thereby achieving spatial separation between the functionalities.

25 21. The process of claim 17, further comprising binding chemical entities to the microarray by reacting them with the plurality of functionalities, wherein only one chemical entity is bound in each well.

22. The process of claim 21 wherein the chemical entities correspond to chemicals present in a chemical library.

30 23. The process of claim 22 wherein the chemical library is a random chemical library.



24. A microarray prepared by the process of claim 21.
25. A method of screening a microarray comprising preparing a microarray according to the process of claim 21 and screening said microarray with at least one probe.
26. The method of claim 26 wherein the probe is a polypeptide.
27. A method of screening a microarray comprising screening the microarray of any one of claims 4 or 12 or 24 with at least one probe.